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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|-----------------------|
| 10/720,035 | 11/21/2003 | Francis Yu-Hei Tsang | 35811-00001 | 2542 |
| 23552 | 7590 | 07/14/2006 | EXAMINER | |
| MERCHANT & GOULD PC P.O. BOX 2903 MINNEAPOLIS, MN 55402-0903 | | | | GREENE, DANIEL LAWSON |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3663 | |

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|----------------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/720,035 | TSANG ET AL. |
| | Examiner Daniel L. Greene Jr. | Art Unit 3663 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 22 March 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-78 is/are pending in the application.
- 4a) Of the above claim(s) 1-21, 26 and 30-78 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 23-25 and 27-79 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 21 November 2003 and 22 March 2006 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Status Inquiry

1. In response to applicants 4/21/2006 Status Inquiry it is noted that the instant application is under review by License and Review (L&R) and will not be released for publication until the proper clearances are obtained or L&R determines that confidentiality or secrecy is not required.

Drawings

2. **The drawings are objected to for the reason set forth in section 3 of the previous Office action mailed 11/22/2005.**

Applicant's amended Figure 4 and corresponding amendment to the specification describing said amendment to Figure 4 are not acceptable and are considered new matter. Accordingly the rejection from the previous Office action is maintained and incorporated herein by reference.

The specification as filed, page 13 lines 24-25, states "...non-active spacers are placed between the Ohmic Contact 10 and the Schottky Contact 30 to maintain separation of the two contacts..." This is NOT considered as having the same meaning as the specification or Figure 4 as amended. For example, there is no basis for indicating the spacers are positioned where they are,

oriented the way they are, the number of spacers should be limited to that shown, or that the spacers “abut” the contacts.

Again, the specification as filed does not set forth any specifics as to the number of spacers, location (other than separating the two contacts), orientation, etc. There is no basis for showing the spacers actually contact the contacts themselves because, for example, the spacers could be shaped such that the dynamic force of the flow of the liquid semiconductor material between the surface of the spacer and the surface of the contact keeps them separated or a difference in pressure between the liquid side of the metal contact and the non liquid side (such as the pressure inside of an inflated balloon) which would require no direct contact. Further, the spacer could be a permeable sheet disposed in the horizontal direction of the cooling channel, vice what applicant has added to figure 4, which appear to look like vertical “posts”.

Since the Examiner has set forth multiple methods of providing non-active spacers and none were initially disclosed in the specification as filed, it is improper to add new matter in an attempt to claim a specific aspect not originally disclosed.

Accordingly new Figure 4 and the corresponding amendment to the specification received in the 3/22/2006 response are considered new matter.

Specification

3. The amendment filed 3/22/2006 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is the amendment to the specification regarding the nonconductive spacers as explained in section 2 above.

Applicant is required to cancel the new matter in the reply to this Office Action.

Response to Arguments

4. Applicant's arguments filed 3/22/2006, with respect to sections 4a-4d, 6a-6d and 6f-6h of the previous Office action mailed 11/22/05 have been fully considered and are persuasive. Accordingly the objections/rejections of **ONLY** these sections have been withdrawn.

5. Further, it should be noted that there appears to be no section 4f in said Office action.

6. **Regarding sections 4e and 4g,** Applicant makes general allegations that those in the art would know what materials to select and that the overall dimensions would vary depending on the application, however then later states that those in the "liquid semiconductor and direct energy conversion sciences" would not obviously arrive at the instant invention because of the issues surrounding liquid semiconductors and page 41 "The interdependencies of all the variables are quite complex."

This appears to set forth that those in the art do not know what materials to use or the manner to combine them. Applicant may not be required to produce a production specification however the statute requires the application itself to inform, not to direct others to find out for themselves; *In re Gardner et al*, 166 U.S.P.Q. 138, *In re Scarbrough*, 182 U.S.P.Q. 298. Note that the disclosure must enable a person skilled in the art to practice the invention without having to design structure not shown to be readily available in the art; *In re Hirsch*, 131 U.S.P.Q. 198.

Again, if applicant is of the opinion that those in the art do indeed know what materials and dimensions would be required to produce an operative embodiment, then he should have submitted evidence in support thereof. General allegations are of no probative value.

7. **Regarding section 6e** and the language of Claim 28 it is noted that the previous rejection is still pertinent since the channel separates the contact layers and the semiconductor must actually flow through the channel between the contact layers in order to travel from one contact layer to the other, not necessarily in one side and out the other side of the channel.

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

8. **Regarding sections 8 and 9**, Applicant's arguments are unpersuasive as applicant has not shown that the references do not teach what the examiner has stated

they teach, nor has applicant shown that the examiner's reasoning for and manner of combining the teachings of the references is improper or invalid.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Applicant's allegations that Brown teaches away from liquid semiconductors is not considered correct because, again, Brown teaches that a higher density results in increased efficiency and Godlezsky et al. teaches that the density of at least some liquid semiconductors increases as temperature increases.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the

references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it is known in the art to use semiconductors and as admitted by applicant, in the last 40 years many properties of liquid semiconductors have been tested, examined, discovered, documented, etc. and the Examiner has set forth how this knowledge was generally available to one of ordinary skill in the art.

Regarding the use of non-active spacers, it is considered a notoriously old and well known BASIC ELECTRICAL PRINCIPLE to keep the electrical contacts of a battery separated from each other to prevent shorting out the battery. This principle is used everyday in, for example, automobile batteries, alkaline batteries, etc. Although Brown may use the solid structure of the semiconductor to maintain the structural relationship between components it would appear obvious to one of ordinary skill to understand that if a solid is changed to a liquid such that the physical properties of said solid structure can no longer be relied upon to provide support, that some method must be employed to maintain said structural relationship and alignment. Again. Lead acid car batteries employ this teaching and as such is considered general knowledge available to one of ordinary skill in the battery art. Further, the 1959 patent to Thomas (2,099,535) can be relied upon as evidence that such is notoriously old and well known.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel L. Greene Jr. whose telephone number is (571) 272-6876. The examiner can normally be reached on Mon-Fri 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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2006-07-06

JACK KEITH
SUPERVISORY PATENT EXAMINER